



EKONOMICKÁ UNIVERZITA V BRATISLAVE
FAKULTA HOSPODÁRSKEJ INFORMATIKY

UNIVERSITY OF ECONOMICS IN BRATISLAVA
FACULTY OF ECONOMIC INFORMATICS



ZBORNÍK ABSTRAKTOV

18. medzinárodná vedecká konferencia
„AIESA – BUDOVANIE SPOLOČNOSTI ZALOŽENEJ NA VEDOMOSTIACH“

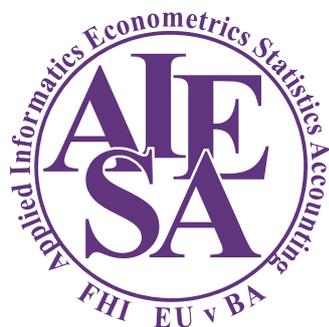
PROCEEDINGS (ABSTRACTS)

18th International Scientific Conference
„AIESA – BUILDING OF SOCIETY BASED ON KNOWLEDGE“

AIESA

Applied Informatics Econometrics Statistics Accounting

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Appled **I**nformatics **E**conometrics **S**tatistics **A**ccounting

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18. medzinárodná vedecká konferencia

„AIESA – BUDOVANIE SPOLOČNOSTI ZALOŽENEJ NA VEDOMOSTIACH“

organizovaná Fakultou hospodárskej informatiky EU v Bratislave
a Slovenskou spoločnosťou pre hospodársku informatiku

pri príležitosti

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prof. Ing. Ivana Brezinu, CSc. – dekana Fakulty hospodárskej informatiky

PROCEEDINGS (ABSTRACTS)

18th International Scientific Conference

„AIESA – BUILDING OF SOCIETY BASED ON KNOWLEDGE“

organized by Faculty of Economic Informatics
and Slovak Society for Economic Informatics

on the occasion of

50th anniversary of Faculty of Economic Informatics

held under the umbrella

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Prof. Ing. Ivan Brezina, CSc. – Dean of the Faculty of Economic Informatics

25. – 26. október 2018 * October 25 – 26, 2018
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Plenárne rokovanie

Plenary Session



Internet věcí v České republice Internet of things in Czech republic

Petr Doucek, Ladislav Luc

Abstract

The article deals with the development of the Internet of Things (farther as „IoT“) in the territory of the Czech Republic. The key role are played mainly by local operators (SimpleCell, Czech Radiocomunicaton and Vodafone / O₂), who are creating a basic communication infrastructure for IoT using different technologies. In particular, the LoRa, SigFox and NB-IoT networks are subject of analysis and comparison. Due to the current commercial development in the using of IoT there are also the part of the article the typical examples of the above-mentioned types of networks.

Key words

Internet of things, LoRa, SigFox, NB-IoT, porting authorasitain code, encryption, chip

Úloha aktuára v společnosti The role of actuary in society

Jozef Dúcky

Abstract

The role of actuary could be simplified into application of technical skills in area of insurance. In reality, the actuary plays important role supporting the management in decision making in insurance, pension and othe r financial institutions. Therefore the application of specific knowledge and skills by an actuary could significantly influence the financial stability of society. It is directly visible in life insurance business, where evaluation of real financial health could be provided and independently assessed only by actuary acting according to credible professionalism rules and with sufficient knowledge and experience. This role of actuary will further grow due to implementation of new regulatory and accounting standards.

Key words

Insurance, actuary, professionalism, social responsibility, continual education

Spatial Analysis of Convergence in the Selected Regions of Central Europe

Michaela Chocholátá

Abstract

This paper analyses the beta-convergence process of 161 NUTS 3 regions of the Central European countries (Austria, Czech Republic, Hungary, Poland, Slovakia and Slovenia) based on labour productivity, which is measured by gross value added (GVA) per employed person (in thousands of Euro) over the period 2000-2015. Both the global and local spatial econometric methods are used for the analysis. Besides the OLS estimation of the standard specification of the beta-convergence model, the spatial error model (SEM) and model with locally varying parameters based on geographically weighted regression (GWR) were estimated. The results proved the relevance of the spatial component and concerning the spatial heterogeneity it was confirmed that the local GWR approach describes the data set better than global methods. GWR estimates furthermore enable to assess and map the different speed of convergence for individual regions.

Key words

Beta-convergence, Central Europe, Spatial econometrics

Credit risk modelling

Lukáš Kalina

Abstract

Credit scoring is a statistical technique that takes into account several characteristics to form a single score that represents the borrower's creditworthiness. It helps to guide the decision process and protects the lender from gaining losses. In our paper we perform a risk analysis of a publicly available credit scoring dataset and build application scorecard to help the investors to estimate the applicant's probability of default.

Key words

Credit Scoring Model, Probability of Default, Scorecard

**Changes in statistical approach to socio-economic investigations
over the last 40 years
(on the basis of conferences organised by UE in Bratislava)**

Józef Pociecha

Abstract

Over nearly 40 years of my attending conferences organised by University of Economics in Bratislava I observed the significant changes in statistical approach to socio-economic investigations. The subject of the presentation is to show how quantitative methods and their applications changes over that time. On the beginning of 80. macroeconomic models of central-planned economy and sectoral models were dominated. Also classical regression modelling and econometric models for socio-economic forecasting were developed. Then taxonomic methods and data analysis methods were introduced. In the last time machine learning and Big Data procedures are applied. The changes in statistical methods applied for socio-economic investigations are illustrated by selected examples of presentations at AIESA and Slovak-Polish-Ukrainian conferences.

Key words

Econometric and Statistical Methods and Methodology

**25 rokov po: vývoj a priesečníky českého a slovenského účtovníctva
25 years after: development and intersections of the accounting in Slovak
and Czech republics**

Miloš Tumpach, Zuzana Juhászová

Abstract

Having taken into account different development processes of the accounting regulatory framework in Czech Republic and Slovakia, the paper is focused on the presentation of the current common and different features and their impact on the relevance of the accounting information. The results are based mainly on the analyses of both the fundamental accounting regulation for the businesses and their different reaction of the several initiatives of the European Union and challenges bring up by the accounting practices by such close cultural and economic jurisdictions.

Key words

regulation, accounting, Slovak republic, Czech republic

Kompozitný index NBS na hodnotenie rizík na trhu s rezidenčnými nehnuteľnosťami

Composite index of NBS for risk assessment on the real estate market

Roman Vrbovský

Abstract

Dynamic growth of real estate prices during recent years brought back sentiments from 2008 and raised questions, whether it can be still considered sustainable or we might face a bubble on the real estate market. Although simple answer to these questions does not exist, it is possible to quantify the risks regarding the current development of real estate prices. In order to assess the risks, it is important to take into account the whole situation on the real estate market, rather than just the prices. Five subindicators were created to fulfill these needs: housing price to income ratio, housing price to rent ratio, housing loans to income ratio, construction to GDP ratio and real price (housing price deflated by inflation). Values of those subindicators are aggregated through the principal components method into one single indicator – the composite index. Therefore, the index should reflect overall current situation on the real estate market and inform about the potential risk of its overheating.

Key words

Real estate market, house prices, principal components, composite index, house price bubble

1. sekcia

1st Section

Informačné technológie a informačné systémy

Informatics technologies and information systems

Potenciál a úskalia fenoménu „big data“ Potential and obstacles of the „big data“ phenomenon

Pavol Jurík

Abstract

Thanks to the rapid technological progression that has started around the 1990s, humanity is currently able to record and process larger amounts of data than ever before. There has been a massive expansion of data capture tools, such as high resolution cameras (tens of megapixels), smartphones, handheld computers, laptops, wireless sensor networks, social networks, earth-orbiting satellites, space-bound telescopes, and so on. Because of the availability of these tools, huge amounts of data (so-called "big data") are recorded on a daily basis. "Big data" are therefore an often discussed phenomenon and are associated with great expectations. The aim of this article is to identify potential benefits of "big data" for different areas of human activities as well as difficulties associated with processing and storing of "big data".

Key words

„Big data“, potential benefits, marketing, structured data, unstructured data

Vnorené dátové typy v objektovo orientovanej .NET aplikácii vytvorenej v jazyku C#

Nested Data Types in a C# object-oriented .NET application

Igor Košťál

Abstract

The paper deals with the implementation of nested data types, classes and structures in a C# object-oriented .NET application that works with a multi-level one-way linked list, called a skip list, and with a single level one-way linked list, called a simple list. We interested whether it is possible to model relations between the main infrastructure of both lists and their data elements by hierarchical relations between the main class and the nested classes and structures created in the source code of this .NET application. We also interested whether it is possible to make the development of this .NET application more transparent and more effective by these nested data types. We tried to verify these premise using the source code analysis of our .NET application.

Key words

Nested Data Types, Nested Classes, Nested Structures, .NET Application

Logické systémy pri riešení ekonomických úloh

Logical systems for solving economic problems

Jaroslav Kultán

Abstract

This paper deals with the analysis of various methods of solving logical problems in the economy. Currently, two-state logic or some fuzzy logic options are used. In some cases, probability logic can be used. All these methods can be replaced in some cases by three-state logic. The paper presents some common and different approaches to using different logic systems. In common life, many times the problem is to answer the given question by the answer yes/no. There is often a degree of indeterminacy in our responses. This indeterminate state can be confused with the third state of the basic unit of measurement. We try to replace the two-bit bit with a three-dimensional trit.

Key words

Trit, bit, algebra with triple system, economic tasks with indeterminacy, fuzzy logic

Moderné trendy vo výrobe a logistike

a ich využitie v podnikovom informačnom systéme

Modern Trends in Production Management and Logistic

and their Application in Company's Information System

Júlia Rakovská

Abstract

There is currently no area of human activity for which the use of information technology would not be characteristic. Many emerging organizations are also improving information and communication technologies and introducing new information systems. Success and well-functioning enterprise management depend on the functional information system. In this paper, we are reviewing the current situation with regard to the use of information systems and we point out the possibilities of increasing the efficiency of human work. We present some new trends in production and logistics and their impact on the enterprise information system.

Key words

new trends, information system, production, logistic

Integrácia grafických rozhraní s jazykom R

Integration of graphical interfaces with R language

Pavol Sojka

Abstract

In past years there is a large boom in all segments of the economy. These sectors generate vast amount of data, which are being stored in data warehouses without any use or they are deleted, because they are actually not usable anymore or because they are duplicates or temporary ones. But nowadays a new possibilities arise to process these seemingly useless data and get additional information from them for reasonable price. This can be done thanks to growing performance of hardware and decreasing hardware prices. So companies can hold greater amount of data and try to process them faster due to performance growth. Companies can then delete already processed data or unusable ones. Many firms offer their software commercially for further data processing and mining, these applications are e.g. SAS, Statgraphic, SPSS and so on. All these applications are provided for money and their purchase can generate significant item in companies' budget. Large companies absorb these expenditures easier than the smaller ones. In our article we emphasize statistical software, which is accessible for free, it is the R language. R language is based on inserting text commands into the terminal screen which can be difficult to learn for some people. There also exist graphical interfaces that can be integrated with R which make usage of R easier. In article we place emphasis on graphical interface called Shiny.

Key words

data processing, statistical software, R language, graphical interface Shiny

Nové trendy elektronického podnikania a ich vplyv na podnikanie na internete

New trends in e-business and their impact on doing business on the Internet

Mária Szivósová

Abstract

When examining new trends and impacts, we have found that the Internet has significant information potential and can not stand outside the trends of the modern information society. Technologies and solutions are being developed to remove barriers to the Internet's connectivity (IC) to a particular computer. The future lies in mobility. The paper deals with new trends such as: m-business, u-business and their potential impact on business.

Key words

e-business, m-business, u-business

Digitálne a sociálne nástroje v transformácii obchodu a ich vplyv na predaj **Digital and social tools in business transformation and their impact on sales**

Mária Szivósová

Abstract

As we know, today's modern digital and social tools are being put up for sale in businesses, and at the same time, it really affects it to a large extent and at different levels. Until recently, it was so that young companies, startups were made in this way. Today it is rather the opposite and at this time full of new technologies, conservativeness does not have to be paid. This, however, does not mean that internet marketing tools automatically mean success. The paper deals with some new knowledge to clarify the effectiveness of sales success.

Key words

online marketing, social networks, business transformation, web analytics

Využitie IS/IT pri výkone činnosti znalca **Use of IS/IT in the performance of an expert's work**

Natália Švejdová

Abstract

The beginning of the expert activity reach until the 13th century, when the expert fulfilled the role of any advisory body in cases where the judge did not know for his limited knowledge and experience to make the right judgment. The development of economies, but especially scientific and technological progress, has led to increased roles, responsibilities and especially claims on experts. At present, it is not enough to be an expert in the one expert field, but also in legislate and especially in information and communication technologies (ICT). The aim of this contribution is to highlight the impact of ICT on expert activity, informatization that has taken place on the territory of Slovakia, but also on the use of IS/IT in the professional activity of experts. The purpose of this article is to understand the meaning and importance of ICT, but also the need to continually expand and improve them.

Key words

information system, information and communication technologies, informatization, expert activity



2. sekcia

2nd Section

**Aktuálne trendy vývoja
teórie a praxe účtovníctva a audítorstva**

**Current trends of development
of accounting and auditing theory and practise**

Riadenie nákladov a výnosov v zariadeniach nemocničnej starostlivosti **Cost and revenue management in hospital facilities**

Renáta Antalová

Abstract

Health care in Slovakia takes the form of outpatient, institutional, nursing and nursing care. Citizens pay insurance premiums to health insurance companies and make payments to healthcare providers. For healthcare providers, the agreed performance and costs costs are important. In order for healthcare providers to achieve good economic results, the area of costs and revenues must be well managed.

Key words

DRG – Diagnosis Related Group, cost centre, kalkulation, cost, revenue

Využitie finančných odhadov vo finančnom riadení podniku **Use of financial estimates in the financial management of the company**

Nikoleta Baloghová, Zuzana Juhászová

Abstract

The aim of the paper is to approach the issue of accounting estimates in financial management of an enterprise focusing on the creation, use or cancellation of provisions and adjustments. Reserves or adjustments may misrepresent the entity's profit or loss on a misstatement and subsequently affect the users of the financial statements. Therefore, it is important to follow up on the creation of accounting items under the law, while respecting the principle of prudence and the principle of true and fair view.

Key words

provisions, adjustments, profit or loss

**Komparácia transpozície smernice EP a Rady
v účtovníctve Slovenskej republiky a Českej republiky**

**The Comparison of Directive
of European Parliament and the Council's Transposition
in the Accounting of the Slovak Republic and the Czech Republic**

Miriama Blahušiaková

Abstract

The aim of the Directive of European Parliament and of the Council of 26 June 2013 was to think small first and to reduce administrative burdens and improve the business environment of micro accounting entities and small-sized enterprises. The Member States of the European Union were obliged to transpose Directive of European Parliament and of the Council into national legislations till 20 July 2015. The aim of the contribution is to analyse the scope of Directive transposition into accounting legislation in the Slovak republic and the Czech Republic pointed on the micro accounting entities and small accounting entities and to compare influence of this implementation on the usefulness of accounting information presented in the financial statements of both analysed countries.

Key words

Transposition, The Directive of European Parliament and the Council, micro accounting entity, small accounting entity, financial statements

Čas a jeho význam pri audite účtovnej závierky

Time and its importance in auditing financial statements

Zuzana Juhászová, Ján Užík, Miloš Tumpach, Zuzana Kubaščíková

Abstract

At the end of the accounting period, accounting units draw up financial statements in which they present their assets, equity and liabilities, costs, income and profit or loss. Part of the entity is required to have its financial statements subsequently audited by an auditor who verifies that the financial statements are prepared correctly in accordance with the applicable reporting framework (whether national legislation - the Accounting Act and the measures of the Ministry of Finance or transnational legislation - International Financial Reporting Standards (IFRS)). In the contribution, we will focus on setting the planned time for the auditing of accounts - the duration of the audit, the reasons for determining the time, the analysis of the measure and its benefits, disadvantages for auditing practice.

Key words

Financial statements, materiality, information from the financial statements, duration of the audit

Postup dohl'adu ECB zameraný na riešenie stavu problémových úverov ECB supervisory approach to stock of non-performing loans

Oľga Kadlečíková

Abstract

The European Central Bank (ECB) 11 July, 2018 announced further steps in its supervisory approach for addressing the stock of non-performing loans in the euro area. The approach follows the work that has already been undertaken in this area, namely the banks' non-performing loans reduction strategies, and the addendum for provisioning for new non-performing loans. It creates a consistent framework to address the stock of non-performing loans as part of the supervisory dialogue through bank-specific supervisory expectations aimed at achieving adequate provisioning of legacy non-performing loans thereby contributing to the resilience of the euro area banking system as a whole.

Key words

European Central Bank, Non-performing loans

Zákon o finančnej kontrole a audite je v súlade so zákonom o štatutárnom audite?

Does the Financial Audit and Audit Act comply with the Statutory Audit Act?

Ladislav Kareš, Veronika Kňazková

Abstract

In our article, we will try to give a positive or negative answer to the question that we have defined in the title of the article - whether the Financial Control and Audit Act is a binding Slovak legal standard in accordance with the Act on Statutory Audit, which is a binding regulation for statutory auditors in Slovakia. Let us try to point out the probable non-compliance of these two legal norms in some areas - from the perspective of the audit profession as such.

Keywords

The Statutory Audit Act, the Financial Audit and Audit Act

Finančné vykazovanie informácií o plnení rozpočtu v účtovnej závierke na všeobecné použitie vo verejnom sektore

Financial Reporting on Budget Information in the General Purpose Financial Statements by Public Sector

Marianna Kicová

Abstract

Financial reporting on budget information belongs to the specific problems of reporting on general purpose financial statements by the public sector. The paper deals with requirements for the financial reporting on budget information of public sector entities that are required to, or elect to, make publicly available their approved budget. Public sector entities also disclose in the notes to the general purpose financial statements of an explanation of the reasons for material differences between the budget and actual amounts. The financial reporting on budget information by public sector entities is useful to enhance the transparency of general purpose financial statements and provide transparent information that is useful for accountability and decision-making purposes.

Key words

Public Sector, Budget, Financial Reporting, General Purpose Financial Statements

Charitatívna lotéria a charitatívna reklama v neziskových účtovných jednotkách

Beneficent lottery and beneficent advertisement in non-profit accounting entities

Alena Kordošová

Abstract

Beneficent lottery and beneficent advertisement are classified as the alternative financial resources of non-profit accounting entities in the Slovak Republic. The paper is focused on examining these alternative financial resources in the conditions of non-profit accounting entities in the Slovak Republic. Beneficent lottery is defined as a gambling game, which combines some features of lotteries and betting games. Beneficent advertisement is such advertisement, which is intended to support charitable purpose. The result of the examination of new specific financial resources is to point out the importance and the particularities of beneficent lottery and beneficent advertisement in non-profit accounting entities and their assessment.

Key words

financial resources, beneficent lottery, beneficent advertisement, non-profit accounting entities

**Analýza účtovného výsledku hospodárenia
rozpočtových organizácií**

**Analysis of profit or loss of the accounting entity
of budgetary organizations**

Antónia Kovalčíková

Abstract

Profit or loss of the accounting entity belongs to traditional but still relevant areas of research from various aspects within the scientific research and expert activities. The article will focus on the profit or loss of the accounting entity - positive or negative result of traditional public sector subjects in Slovakia – budgetary organizations. We perform the analysis based on the knowledge of determination of the profit or loss of the accounting entity, its economic substance, accounting and presentation in the individual financial statements in accordance with accounting regulation and financial statements regulation in the Slovak republic valid into present (from the year 2008). The standalone part of the article presents results of the analysis of profit or loss of the accounting entity, that we performed on the individual financial statements of the selected accounting subjects - specific budgetary organizations over the period of 5 years.

Key words

Profit or loss of the accounting entity, Accrual basis, Accounting, Budgetary organization

Analýza nefinančných údajov z výročných správ

Annual Reports Narrative Data Analysis

Zuzana Kubaščíková, Miloš Tumpach, Zuzana Juhászová

Abstract

When assessing a firm's current and future financial performance, various information sources are available to interested parties. Annual reports, within which companies reveal their activities, results, developments and trends, are one of the most important information sources. Such a report contains, alongside financial data, narrative disclosure of contextual non-financial information providing broader insight into a company's business and performance. With the increasing average length of narratives in recent years we may also observe the growing interest of investors or analysts in information revealed here as a means of supporting their decisions. The aim of this paper is to accept or reject the claims that non-financial "narrative" data could also be used for the assessment of the financial position and financial performance of a company.

Key words

financial statements, sentiment analysis, narrative data, annual report

Nové formy podnikania s akcentom na digitálne platformy

The new forms of business with the emphasis on digital platforms

Martina Mateášová, Milan Gedeon

Abstract

A digital platform is a hardware or software platform that is necessary to create applications and manage applications (article 2 (ag) of the Income Tax Act). This was established in the legal framework of the Slovak Republic as response to new forms of business based on the commissions on brokering services in the field of transport or accommodation via digital platforms. Form of business mentioned above is characterized by the absence of physical presence of a taxpayer with limited tax liability in the territory of a state in which the services are provided. The performance of human activity is replaced by automated processes with help a computer algorithm often located in a jurisdiction with low or no level of taxation. Therefore, the purpose of this paper is the analyse of the legislative of these new business trends, particularly in terms of taxes.

Key words

Digital platform, Digital Single Market, Permanent Establishment

Účtovníctvo v kontexte globálneho ekonomického vývoja

Accounting in the context of global economic development

Jitka Meluchová, Martina Mateášová

Abstract

In the past decade, an accounting has undergone significant changes in process automation, robotization, and unification of individual activities. An accountant who manages the accounting manually and alone for a single company is slowly becoming a past. Shared services centers (SSC) are specialized centers set up to provide comprehensive coverage of economic activities, including bookkeeping. Shared services centers perform their activity regardless of location, language and subject of activity. SSC enable lower costs, more efficient asset utilization, process standardization, flexibility of implemented changes, etc. All these changes brought by the practice of large corporations and multinationals must also be implemented into the preparation of students for their future employment in the labor market. The article maps the current situation, analyzes the benefits and risks of these trends and identifies the areas and activities necessary for current practice.

Key words

Accounting, Shared Services Center, Automation of Activities, Transnational Company

Zdroje finančných informácií o účtovnej jednotke v Slovenskej republike

Sources of Financial Information of an Accounting Entity in the Slovak Republic

Branislav Parajka, Lucia Ondrušová

Abstract

The objective of financial statements is to provide financial and other information of an accounting entity that is useful to a wide range of users in their decision making. In the Slovak republic financial statements are nowadays published by the Register of financial statements where information is publicly available free of charge. There was a different approach for publication of financial statements - by the Business register or in some cases by the Commercial bulletin. This article is about methods of publication of financial statements and about retrieving financial information about an accounting entity with pros/cons comparisons of each method.

Key words

Financial statements, financial reporting, publication

Pravidlo o obmedzení zahrnutia úrokov do základu dane z príjmov

Interest Limitation Rule and Income Tax Basis

Anna Šlosárová

Abstract

There are measures against tax duties avoiding stated in the ATAD directive. Interest limitation rule, that is this contribution's research object, belongs also to these rules. EBITDA is the basic entry for calculation of interest recognized as tax expense. The aim of the contribution is to explain the calculation of EBITDA nature for various purposes and to point out its specific understanding in case of application interest limitation rule. The basic source of information for EBITDA calculation is always accounting. Relevant information from this area should be through financial statements, especially notes to the financial statements, provided to user.

Key words

ATAD directive, income tax law, EBITDA, low capitalization rule, interest limitation rule

3. sekcia

3rd Section

Aplikácia štatistických a aktuárskych vied v sociálno-ekonomickej oblasti

Application of statistical and actuarial sciences in social-economic area

Analýzy procesu prebytku v spojitom čase založená na využití inverzného Gaussovho rozdelenia

Analysing a surplus process in continuous time using an inverse Gaussian distribution

Galina Horáková

Abstract

The analysis of capital injection strategies in the insurance risk model literature usually assumes that whenever the surplus tends towards negative values a level of capital is injected necessary to permit the company to continue operating, i.e. such that the surplus returns to being positive and possible insolvency is averted. The aim of the paper is first to use the characteristics of the inverse Gaussian distribution to set measures of the followed risk, to justify an approach why this distribution relates to a model of the time to ruin occurring and to use this fact to analyse the values of the surplus in continuous time.

Key words

Surplus process, compound Poisson process, continuous-time ruin models, inverse Gaussian distribution, Conditional Tail Expectation

Analýza vybraných ukazovateľov charakterizujúcich vylúčenie z trhu práce

Analysis of selected indicators characterizing exclusion from the labour market

Ľubica Hurbánková

Abstract

We analyse in the paper selected indicators that characterize one of the dimensions of poverty and social exclusion – exclusion from the labour market. The aim of the paper is to evaluate the trend in the development of indicators in years 2008 – 2016 in European Union countries. We have selected indicators of unemployment rate, very low work intensity rate for people under 60, the share of the 18 – 59-year-old population in non-employment households, the share of early school leavers and they not continuing education and rate of youth people out of employment, education and other training. We will look at the number of unemployed persons in the EU countries in 2008 and 2016. We will find out based on the contribution method which country more contributed to the overall increase in the number of unemployed in the EU. We will use the Ryabtes index to examine whether the structure of this indicator has changed in 2016 compared to 2008.

Key words

exclusion from the labour market, the number of unemployed, the contribution method, Ryabtes index

Nezamestnanosť klesá, zaostávajúce regióny pribúdajú Falling unemployment with increasing number of lagging regions

Katarína Karasová

Abstract

The unemployment rate in the Slovak Republic currently reaches its historical minimum. However, the number of people without work decreases faster in districts in the western part of the country than in poorer districts within the southern and eastern parts of Slovakia. The number of underdeveloped districts is increasing. The aim of the article is to analyse and evaluate unemployment in the Slovak Republic between 2001 and 2018 at both national and regional level. Using various statistical methods, we looked at unemployment and its differentiation not only from a spatial but also a time perspective. We have identified whether regional disparities in unemployment rates tend to persist, increase or counterbalance.

Key words

unemployment rate, regional disparities, underdeveloped districts, Gini index

Analýza relatívnej odchýlky ekvivalentného disponibilného príjmu slovenských nechudobných domácností od hranice rizika chudoby prostredníctvom všeobecného lineárneho modelu

Analysis of the relative deviation of the equivalent disposable income of not poor Slovak households from the risk of poverty through the general linear model

Eva Kotlebová

Abstract

In addition to material deprivation and exclusion from the labor market, income poverty is a key component of poverty and social exclusion in the context of the Europe 2020 strategy. Several indicators are used to measure it. From the point of view of comparability and good interpretability, the relative measure of equivalent disposable income from the poverty line is an appropriate measure, the analysis of which the contribution deals with. Through the general linear model, using the EU SILC database, relevant factors affecting the size of the indicator are identified for Slovak households whose income is above the poverty line.

Key words

Income poverty, Poverty line, Relative deviation of equivalent disposable income from the poverty line, General linear model

Operačné riziká finančných inštitúcií

Operational Risks of Financial Institutions

Zuzana Krátka

Abstract

Operational risk is one of the oldest risks faced by financial institutions. This is a risk of loss due to poor adjustment or failure of internal mechanisms and controls, due to human or systemic misconduct and the like. Operational risk, with its specific characteristics that complicate its measurement and often identification, has gradually become the focus of financial market regulators. The growing complexity of processes, increasingly sophisticated technologies and globalization require a new approach to managing the operational risks of financial institutions. The paper focuses primarily on the main operational risks of insurance companies operating in the Slovak insurance market and on the possibilities of their effective management.

Key words

operational risk, operational risk management, Solvency II

Prečo využívať simulácie v teórii rizika v neživotnom poistení?

Why use simulations in the risk theory in non-life insurance?

Vladimír Mucha

Abstract

The aim of the paper is to describe the benefits of using simulations in the field of risk theory in non-life insurance. The contribution focuses on the case of discrete distribution of individual claims in the context of compound distributions. We emphasize the comparison of R-based simulations with standard methods of risk theory. The simulation techniques presented here are an effective solving tool that enables actuarial analysis to be performed in context with real parameters. The presented methodology is a substitute for extremely challenging numerical approaches, or sometimes it is the only solution that offers real solutions with the required precision.

Key words

non-life insurance, risk theory, simulation, Monte Carlo method, RStudio

Potreba životného poistenia z pohľadu požiadaviek osobných a rodinných financií

Life insurance need in terms of personal finance

Erika Pastoráková, Žaneta Brkalová

Abstract

Personal finances include planning and forecasting key activities. Recognizing the possibility of negative risk exposure is a crucial moment for securing yourself and your family. The existing insurance theory sees the need for life insurance or the need for establishing an insured figure according to the cost and income principle. The article examines the principles based on real data in the Slovak Republic and indicates both, the extreme low insurance as well as the deviations in the determination of the life insurance sum over time.

Key words

insurance in personal finance, the theory of the sum insured in life insurance, empirical verification on data from Slovakia

Vlastnícky vzťah k bývaniu v krajinách EÚ

Housing Tenure Status in the EU Countries

Ľubica Sipková, Viera Labudová

Abstract

The right to housing is a basic human right. This has been established in a range of international human rights instruments and the right is regularly monitored by the United Nations and by European Commission. The individual EU countries differ in the distribution of population by tenure status. We quantified these differences between selected EU countries using a statistical measure of similarity of structures. We used data from the European Union Statistics on Income and Living Conditions (EU SILC). The dataset contained data on distribution of population by tenure status (owner, with mortgage or loan; owner, no outstanding mortgage or housing loan; tenant, rent at market price and tenant, rent at reduced price or free).

Key words

social housing, EU SILC, similarity of structures, cosine coefficient

Pohľad na emigráciu v Európskej únii v roku 2016

View of emigration in the European Union in 2016

Daniela Sivašová

Abstract

We analyse in the paper selected indicators that characterize the evolution of migration in the European Union countries in 2016. The aim of the paper is to look more closely into the issue of migration, namely emigration in the European Union and the Slovak Republic, which is part of this integration unit. When processing the issue, we used the data obtained from the Statistical Office of the Slovak Republic from DATAcube. Using graphical presentations, calculations and outputs, we have gradually described the structure of emigration, the direction in which it evolved, and on the basis of the calculated migration indicators, we have evaluated its status.

Key words

migration, mobility, emigrant, immigrant, permanent residence

Sekuritizácia katastrofických mortalitných rizík

Securitization of catastrophe mortality risks

Lenka Smažáková, Ľudovít Pinda

Abstract

Catastrophes are a big potential problem for solvency of not only non-life but also life insurance companies. The extent of the consequences of man-made or natural disasters, such as tsunami or earthquakes, can be fatal and therefore insurers are looking for reinsurance possibilities. As the capacity of reinsurance market is often insufficient to cover catastrophic events, insurers are looking for alternative risk transfer on capital market, which has greater capacity than insurance market. Securitization of mortality risk, as a new instrument of risk management, has expanded the life insurance industry's capacity by transferring catastrophic losses to the financial market. In this paper we will discuss models of valuation of bonds linked to mortality and longevity risks. Due to fact, that mortality jumps are needed to take into account and that securities linked to pure mortality risk cannot be replicated by other tradable securities, we suggest that valuation of mortality bonds was in conditions of incomplete markets with mortality jumps.

Keywords

Swiss Re bond, EIB bond, Wang transform

**Využitie Vollterovej rovnice pri odhade
pravdepodobnosti krachu poisťovne**
**Use of the Vollter equation in estimating
the ruin probability of an insurance company**

Anna Strešňáková

Abstract

Many ways are used to estimate the probability of ruin of an insurance company. The basis for all, however, is to estimate when the insurer's reserve falls below zero. The process as such is difficult not only for mathematical procedures, but also for input variables, estimation of parameters affecting the model, and selection of the used method. The article focuses on the use of Vollter's integral equation in probability estimation and its subsequent modification to the form suitable for the use of numerical methods.

Key words

Ruin probability, Vollter's integral equation, numerical integration

**Application of Generalized Linear Models in Non-Life Actuarial
Framework**

Marek Strežo

Abstract

One of the main efforts of this paper is to present the methodology behind the generalized linear models, also known by acronym GLMs which represent an important class of the regression models. The actuaries try to find the best model for setting the premium. It involves the statistical analysis of insurance data, taking into consideration various properties of insured object and the policyholder. We state how to achieve the adequacy of model comparing the nested models. The models are compared by analysis of deviance and Akaike information criterion (AIC) used as a comprehensive tool for model selecting. Other purpose of this paper is to introduce tariff analysis, where the actuaries perform to obtain a tariff. Theoretical approach will be demonstrated on practical example of car insurance.

Key words

Exponential Models, Frequency model, Severity model, Residuals, Akaike information criterion (AIC) and Scaled deviance

Stochastické modely nemocenského poistenia a ich riešenie v open source systéme MAXIMA

The stochastic models of sickness insurance and their solution in the MAXIMA open source system

Lea Škrovánková, Jozef Fecenko

Abstract

The aim of this paper is to show the possibility of using actuarial mathematics in health insurance. The contribution uses the conceptual apparatus of non-homogeneous Markov processes and the theoretical knowledge of the subject. It also discusses ways to evaluate Markov processes in connection with system modeling. For the insurance company's calculations, it is important to know the probability that the insured will be in a given state after a certain period, e.g. whether he will be healthy, sick or dead. In our case, we have solved a five-state model. The solution of the created model was reached into the application form by using the MAXIMA open source system to solve the corresponding differential equation system.

Key words

sickness insurance, multistate models, Markov processes, probability of transition, matrix of transition

Príjmová chudoba a sociálne vylúčenie slovenských domácností vo vzťahu k relevantným faktorom

Income poverty and social exclusion of Slovak households in relationship to relevant factors

Erik Šoltés, Tatiana Šoltésová

Abstract

The article focuses on the identification of factors that impact the risk of poverty and social exclusion in Slovak households and the quantification of the influence of these factors. For that purpose, the aggregation of sub-indicators of poverty and social exclusion (at-risk-of-poverty rate, severe material deprivation rate, very low work intensity rate) into the indicator AROPE (at-risk-of-poverty or social exclusion rate) was used. Since Slovakia has a relatively high share of inhabitants who have to face all three mentioned dimensions, we put emphasis on analysis of this most severe form of poverty and social exclusion of Slovak households. Statistical analyses were carried out in analytics software SAS Enterprise Guide by means of logistic regression. Presented results of our own empirical analyses are based on data from survey EU-SILC 2016.

Key words

poverty and social exclusion, AROPE – at-risk-of-poverty or social exclusion rate, EU-SILC – European Union Statistics on Income and Living Condition; logistic regression

4. sekcia

4th Section

**Aplikácia modelov a metód operačného výskumu
a ekonometrie v ekonomickom rozhodovaní**

**Application of operation research and econometric
models and methods in economic decision making**

Acyklické grafy ako nástroj grafickej analýzy rozhodovacích procesov

Acyclical Graphs as a Graphic Analysis Tool of Decision-making Processes

Ivan Brezina, Pavel Gežík, Juraj Pekár

Abstract

The acyclic graph is such a non-oriented graph that does not include a closed cycle subgraph. A special type of acyclic graphs is a tree where the tree is a non-coherent continuous acyclic graph in which there is just one path between each of the two vertices. The tree is a non-empty final continuous acyclic graph with nodes and edges for which $n = m + 1$. The root tree is such a tree that has a uniquely determined root and can be drawn such that the lower level peaks are located above the higher, respectively vice versa. Root trees are the basis for making decision trees in decision making. The decision tree is a graphical representation of the structure of the decision process using root trees. Decision trees represent representation of the decision process and allow decision making based on the rules defined in the tree structure. With decision trees, we encounter fairly often in the ordinary life, for reasons of clarity and simple interpretability. The paper will present the possibilities of using decision trees in decision-making processes.

Key words

Decision Tree, Acyclic Graph

Hranovo orientované metódy kritickej cesty versus uzlovo orientované metódy kritickej cesty s deterministickou a stochastickou grafovou štruktúrou

Edge-oriented critical path methods versus node-oriented critical path methods with deterministic and stochastic graph structure

Ivan Brezina, Juraj Pekár, Pavel Gežík

Abstract

The most known quantitative approaches to the project management are well-known critical path methods, particularly Critical Path Method (CPM), Project Evaluation and Review Techniques (PERM), MPM (Metra Potential Method), either edgeline or nodal-oriented with a deterministic graph structure. Generalization of object management methods is represented by GERT (Graphic Evaluation and Review Technique). This method with a stochastic graph structure is based on the assumption that the whole project as well as the individual activities are realized on the basis of a certain conditional probability and that all the proposed activities may not be realized as well. The GERT method is implemented on an edge-oriented network diagram with a stochastic structure, meaning that at least one node has an interpretation different from the conjugative-deterministic. In the paper the methods will be described, compared and evaluated.

Key words

Project Management, Critical Path, Graph, Edge, Node

Bezdrôtová komunikácia ako diskoordináčná hra**Discoordination Game in the Field of Wireless Communication**

Zuzana Čičková, Matej Zagiba

Abstract

In static games in game theory, it is often impossible to identify a unique equilibrium solution. One of the typical examples of such a game is a discoordination game, which is a combination of co-ordination game and anti-coordination game (a problem to solve is to choose from multiple equilibrium solutions). In this paper we present the possibility to use a discoordination game in a field of wireless communications. We will formulate the game as a two-player, zero-sum game in a typical communication problem. Its essence is to send packets to the recipient, with one of the players trying to do so, and his opponent attempts to prevent this communication.

Key words

Network security, Game theory, Matrix games

Efektívna regulácia sieťových odvetví – impulz rozvoja ekonomiky**Effective Regulation of Network Industries - Impulse of Economy Development**

Michal Fendek

Abstract

Models of regulation mechanisms in network industries take more and more important role as the pressure on the social effectiveness and objectivity of pure monopolies is on the rise. Their proper objective is to create such a price and product supply which would the best correspond to prices created on the open market.

Creation of a new regulatory framework was an important part of restructuring changes on the market with electricity, gas and other goods of network industries in the Slovakia. In August 2001 the Regulatory Office for Network Industries (hereinafter referred to as "RONI") was established to issue licenses and regulate prices and quality standards of goods in network industries. The goal of the submitted paper is to present the methodologic results of application of models for price regulation in network industries in the Slovakia.

Key words

Network industries, regulation mechanisms, reasonable profit in regulated industries, Regulatory Office for Network Industries, analytical methods for price regulation

Cenové stratégie v podmienkach cenovej diferenciácie pri trhovej dominancii monopolu

Pricing Strategies in the Conditions of Price Differentiation under the Monopoly Market Dominance

Eleonora Fendeková, Iveta Kufelová

Abstract

We can speak of a price differentiation of a monopoly production when a monopoly uses its market position or economic power to set and enforce a market price in accordance with its interests and thereby ensures maximum profit on a relevant market. We can say that a monopoly uses its position to reach a monopoly profit, which exceeds profit on a perfect competition market. Due to a specific position, which the subjects on a supply side have on an imperfect competition market, the producers can promote their interests without immediate danger of a competitor producing the same or similar product entering a relevant market.

In this article, we will analyze a model of a monopoly behavior optimization, whose willingness with application tools of price differentiation to maximize his profit on relevant market.

Key words

Perfect price differentiation, imperfect competition market, relevant market, monopoly profit maximization model

Simulační model vývoje síťové ekonomiky

Simulation model of network economy development

Petr Fiala

Abstract

The paper is dedicated to network development in the network economy. The current economy needs to look not only at networks with only dynamic flows and with a fixed structure, but as a dynamic system its structure evolves and changes. Structure and behavior dynamics of network systems can be modeled as complex adaptive systems and use agent-oriented simulation to demonstrate origin, perturbation effects, and sensitivity with regard to initial conditions. Survival of companies is associated with the value of so-called fitness function. Companies whose fitness value falls below a certain threshold will be extinguished. In this way, it is possible to partially model network growth.

Key words

network economy, simulation, dynamics

Prístupy prerozdelenia výhier v kooperatívnej hre Redistribution approaches of Cooperative Game

Dana Figurová

Abstract

The Cooperative Game Theory explores the positive effects of creating a coalition based on binding agreements. In general, we distinguish cooperative games with transferable and non-transferable winnings. For cooperative games with non-transferable winnings it is characteristic that prize winnings are tied to individual winners and their use cannot be transferred to other teammates. In a cooperative game with transferable winnings, winners can earn winnings from all members of the coalition. This contribution is aimed at presenting different redistribution approaches result from mutual cooperation among members of the coalition. An important factor determining the cooperative behaviour is that by its realization the participants increase the achieved profits or at least the probability of their achievement against other - non-cooperative strategies. It is based on negotiation theory, which generally distinguishes the following ways of redistribution – egalitarian, utilitarian, Nash and Kalai – Smorodinski solution.

Key words

cooperative game, game theory, redistribution in game theory

R&D Spatial Spillovers across the EU regions: Quantification and sensitivity analysis based on the spatial econometric approach

Andrea Furková

Abstract

This paper explores spatial spillovers of R&D (research and development) indicators among 245 NUTS (Nomenclature of Units for Territorial Statistics) 2 EU (European Union) regions for the 2003–2014 period. Based on the spatial extension of the conditional *beta*-convergence model, income convergence among the EU regions has been confirmed. We have also found out that examined R&D (research and development) indicators (patents applications and human resources in science and technology) play an important role in regional economic performance of the EU regions. Calculated direct, indirect and total impacts and their spatial partitioning indicated that there is not only the link between R&D indicators and economic growth within the region but in addition, the innovation and knowledge spill over to neighbouring regions and influence the economic performance of these regions.

Key words

Beta-convergence model, R&D indicators, SAR model, Spatial spillovers impacts

MS Excel/LINGO solver for DEA models

Josef Jablonský, Petra Zýková

Abstract

The paper presents an original DEA solver that uses MS Excel environment for data management and LINGO modeling system for supported models' entry and their solving using in-build LINGO solvers. LINGO contains a modeling language that allows general notations of models and powerful linear (and non-linear) optimization solvers. Trial downloadable version of LINGO allows solving problems up to 300 variables and constraints. That is why for the users having installed this trial version, the DEA solver is limited by these numbers, i.e. the users can solve problems with the total number of decision making units plus total number of variables (inputs and outputs) not exceeding the limit number of variables (constraints). Nevertheless, the users with a professional version of LINGO can solve problems with thousands of decision making units easily.

Key words

Data envelopment analysis, Efficiency, MS Excel, LINGO

Analýza faktorov zahraničného obchodu pomocou gravitačného modelu

Analysis of foreign trade factors using the gravity model

Brian König

Abstract

The article deals with the analysis of factors affecting the size of foreign trade of 212 countries in the world during the periods of 2000-2015. The analysis is performed on the basis of the gravity model, where the dependent variable is the volume of the export, while Poisson's estimator of pseudo-maximum likelihood was used to estimate the model parameters. The results obtained show that among the observed factors (the importer's per capita GDP, the number of inhabitants of the importer, the distance between the capitals of the countries, the existence of a common border between the pair of countries, the EU membership of the country of export, the EU membership of the country of import, the import tariffs, the existence of a trade agreement between an exporter and an importer) the existence of a common border has the greatest impact on the volume of exports.

Key words

Gravity model, International trade, Export

Analýza interakcií burzových trhů Spojeného království a Německa prostřednictvím DVECH modelu

Analysis of interactions between the United Kingdom and Germany stock markets based on DVECH model

Stanislav Kováč

Abstract

This paper deals with the estimation of the diagonal VECH (Vectorized GARCH) model within the analysis of interactions between the United Kingdom and Germany stock markets. Current state of solved issue as well as the used methodology are briefly presented in the paper. In the empirical part of the paper it follows the estimation of bivariate DVECH model for the daily returns of stock indices. There is also a graphical illustration of conditional correlation.

Key words

interactions among stock markets, DVECH model

Aplikace metod MCDM pro srovnání automobilů z pohledu používaných pohonných hmot

Application of the MCDM methods for the comparison of cars in terms of used fuels

Martina Kuncová, Denisa Mouchová

Abstract

The term alternative type of fuel has recently become a very common topic in the automotive industry. Although gasoline and diesel cars are still on the market, other types of fuels such as LPG, CNG or electric drives are becoming more and more popular. In this paper we compare selected representatives of vehicles offered on the Czech market, which use 6 different types of fuels (gasoline, diesel, LPG, CNG, electric, plug-in hybrid). The comparison is based on 8 non-price and 4 price criteria (including the estimation of the cost for the average year of operation). The WSA, TOPSIS and ELECTRE methods were used for analysis.

Key words

Multi-criteria evaluation, types of car fuels, technical specifications, price criteria, comparison

Zónovanie v hraničnom asymetrickom meste

Zoning in a cross border asymmetrical city

Allan Jose Sequeira Lopez

Abstract

This paper investigate the case of two bordering towns of different size, in each towns there is a regulator who decides if the zoning of the local firms is implemented or not. It is a specific type of a spatial competition game when a location of the player (firm) is determined by the regulator. The regulator has an incentive to gain consumers from the other town and he will approve only locations for a firm close enough to the border. We will analyze the situation when only one regulator decide to do zoning and the other one no and we will illustrate this situation in a small example.

Key words

Zoning, spatial game, location choice

Výber optimálnej množiny autobusových liniek v integrovanom dopravnom systéme

Problem of optimal set of bus lines in public municipal transport

Tomáš Majer

Abstract

The paper proposes a linear programming model for selecting an optimal set of lines for integrated public transport system. A logical requirement is that optimal set does not contain parallel bus and railway lines. Set of almost all possible bus and railway lines and an origin-destination matrix which enumerate number of passengers traveling between different stops are given. For every relation in origin-destination matrix several possible paths (with or without line change) are calculated. The goal of optimization is to find a set of lines so that the timetable calculated in next step of optimization requires minimal number of buses. Of course, all requirements of passengers must be met without significant travel time increase.

Key words

Public transport, shortest path, mixed linear programming

Možnosti dekompozície rozvrhovacieho problému vozidiel Possibilities of decomposition of vehicle scheduling problem

Stanislav Palúch

Abstract

K. Vašek showed in (Vašek, 1985) the way how it is possible to decompose every vehicle scheduling problem into two ones solvable separately. This way of decomposition was useful in optimization using graph theory models which was implemented on computers SMEP. Decomposition enabled us to overcome memory and speed limits of computers and to solve large practical problems exceeding memory limits. The memory and speed of computers skyrocketed till that time. Capacity and speed of computers was accompanied with an enormous development of software for mathematical programming. This software can solve even large real life instances in reasonable time and moreover it can implement many other restrictions. This paper shows the way, how to make use the idea of decomposition for reduction o size of corresponding mathematical models.

Key words

bus schedule, optimization, vehicle scheduling, decomposition

Robustná linkotvorba s viacerými scenármi dopytu cestujúcich Robust line planning with multiple passenger demand scenarios

Štefan Peško

Abstract

Current domestic and foreign models of line planning are based mostly on deterministic models where passenger demand is modeled by OD-matrices at appropriate times (tops and saddles) of the day. In the case of uncertain demand, a probabilistic distribution with estimated parameters is assumed in stochastic models. In this paper, we will show another way of using electronic data on daily journeys (arrivals and departures) of passengers traveling to the monitored time phase (eg, the month). We form a robust model that is a generalization of a successful PRIVOL model in which the daily OD of the matrix of the week creates appropriate passenger demand scenarios. We verify the model on data from October 2017 in the Rajecká valley bus network.

Key words

Line planning, scenarios, robust model



Zoznam účastníkov / Content of participants

Plenárne rokovanie / Plenary session

prof. Ing. Petr Doucek, CSc.

Ing. Jozef Dúcky

doc. Ing. Michaela Chocholatá, PhD.

doc. Ing. Mg. Zuzana Juhászová, PhD.

Ing. Lukáš Kalina

Ing. Ladislav Luc

prof. dr hab. Józef Pocięcha

prof. Ing. Miloš Tumpach, PhD.

Mgr. Roman Vrbovský

1. sekcia / 1st section

Informačné technológie a informačné systémy Information technologies and information systems

Ing. Pavol Jurík, PhD.

Ing. Igor Košťál, PhD.

Ing. Jaroslav Kultán, PhD.

Ing. Mgr. Júlia Rakovská, PhD.

Ing. Pavol Sojka

Ing. Mária Szivósová, PhD.

Ing. Natália Švejdová

2. sekcia / 2nd section

Aktuálne trendy vývoja teórie a praxe účtovníctva a audítorstva Current trends of development of accounting and auditing theories and practise

Ing. Mgr. Renáta Antalová, PhD.

Ing. Nikoleta Baloghová

Ing. Miriama Blahušiaková, PhD.

Ing. Milan Gedeon

doc. Ing. Mgr. Zuzana Juhászová, PhD.

Ing. Oľga Kadlečíková, PhD.

doc. Ing. Ladislav Kareš, PhD.

Ing. Marianna Kicová, PhD.

Ing. Veronika Kňazková, PhD.

Ing. Alena Kordošová, PhD.

doc. Ing. Antónia Kovalčíková, PhD.

Ing. Zuzana Kubaščíková, PhD.

Ing. Martina Mateášová, PhD.

doc. Ing. Jitka Meluchová, PhD.

Ing. Lucia Ondrušová, PhD.

Ing. Branislav Parajka, PhD.

prof. Ing. Anna Šlosárová, PhD.

prof. Ing. Miloš Tumpach, PhD.

Ing. Ján Užík, PhD.

3. sekcia / 3rd section

Aplikácia štatistických a aktuárskych vied v sociálno-ekonomickej oblasti **Application of statistics and actuarial sciences in social-economic areas**

Ing. Žaneta Brkalová
doc. RNDr. Jozef Fecenko, CSc.
doc. RNDr. Galina Horáková CSc.
Ing. Ľubica Hurbánková, PhD.
Ing. Katarína Karasová, PhD.
RNDr. Eva Kotlebová, PhD.
Mgr. Ing. Zuzana Krátka, PhD.
doc. RNDr. Viera Labudová, PhD.
doc. Mgr. Vladimír Mucha, PhD.
prof. Ing. Erika Pastoráková, PhD.

prof. RNDr. Ľudovít Pinda, CSc.
doc. Ing. Ľubica Sipková, PhD.
RNDr. Daniela Sivašová, PhD.
Ing. Lenka Smažáková
RNDr. Anna Strešňáková, PhD.
Ing. Marek Strežo
doc. RNDr. Lea Škrovánková, PhD.
doc. Mgr. Erik Šoltés, PhD.
Mgr. Tatiana Šoltéssová, PhD.

4. sekcia / 4th section

Aplikácia modelov a metód operačného výskumu a ekonometrie **v ekonomickom rozhodovaní** **Application of operational research and econometrics models** **and methods in economic decision making**

prof. Ing. Ivan Brezina, CSc.
doc. Ing. Zuzana Čičková, PhD.
prof. Ing. Michal Fendek, PhD.
prof. Ing. Eleonora Fendeková, PhD.
prof. RNDr. Ing. Petr Fiala, CSc.
Ing. Dana Figurová
doc. Ing. Andrea Furková, PhD.
Ing. Pavel Gežík, PhD.
prof. Ing. Josef Jablonský, CSc.
Ing. Stanislav Kováč
Ing. Brian König, PhD.

Ing. Iveta Kufelová, PhD.
Ing. Martina Kuncová, Ph.D.
Ing. Allan Jose Sequeira Lopez
Ing. Tomáš Majer, PhD.
Ing. Denisa Mouchová
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